Hypertensive Disorders of Pregnancy: Prevalence, Maternal Complications and Perinatal Outcomes at Lilongwe Central Hospital, Malawi

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As partial fulfillment for the award of the Master of Philosophy Degree in International Community Health

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HYPERTENSIVE DISORDERS OF PREGNANCY: PREVALENCE, MATERNAL AND PERINATAL OUTCOMES AT LILONGWE CENTRAL HOSPITAL, MALAWI.

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ABSTRACT

Objectives of the study were to determine the prevalence, maternal complications and perinatal outcomes of pregnancy in patients with Hypertensive Disorders of Pregnancy (HDP).

Materials and Methods: A retrospective study was done by reviewing patients' journals at Lilongwe Central Hospital (LCH) Maternity wing from January 2003 to June 2003. Those with HDP were then selected for the study.

Results: From a total of 5248 deliveries during the period of study, 70 HDP cases were identified. Only 36 (51%) booked for antenatal care. The overall prevalence was 13 per 1000 deliveries. The mean age of the cases was 23.9 years. Among the cases 47 (67.1%) were younger women of the age group 16-25 years. Thirty-five (50%) of the 70 cases were primigravidae and 65 (93%) were married women. Of the five single mothers, eclampsia affected 4 while 45 married women were preeclamptic. There were similarities in the distribution of pre-eclampsia and eclampsia amongst the residential areas with higher number of urban cases compared to rural cases. There were 8 cases who had pregnancy induced hypertension (PIH) in their previous pregnancies. Maternal complications included 17 cases of severe preeclampsia, 24 cases of eclampsia, 3 cases of disseminated intravascular coagulation (DIC), 3 cases of acute renal failure (ARF), 1 case of pulmonary oedema, and 1 case of maternal death. Perinatal outcomes included 34 preterm deliveries, 27 low birth weight babies, 7 stillbirths and 1 neonatal death.

Conclusion: The prevalence rate of HDP is lower than those of South Africa and Zimbabwe. This finding may be attributed to underutilization of maternity services (55% deliver in hospitals in Malawi). Primigravidae were the most affected group in this study (50%) of all the cases, a finding that is similar to findings of various studies.

ABBREVIATIONS:

ANC : Antenatal Care

CHAM : Christian Hospital Association of Malawi

MDHS : Malawi Demographic and Health Survey

DHO : District Health Officer

EOC : Emergency Obstetric Care

HDP : Hypertensive Disorders of Pregnancy

MOH&P: Ministry of Health and Population

MMR : Maternal Mortality Ratio

PHC : Primary Health Care

PIH : Pregnancy Induced Hypertension

WHO : World Health Organization

LCH : Lilongwe Central Hospital

PMH : Princess Marina Hospital

LBW : Low Birth Weight

IUGR : Intrauterine growth retardation

IUFD : Intrauterine foetal death

DIC : Disseminated Intravascular Coagulation

ISSHP: International Society for the Study of Hypertension in Pregnancy

DEDICATIONS:

This work has been dedicated

To my God – My Provider and Sustainer

To my Father – Your advices have kept me through

To my Mother – You have always been my Hero

To my Dear Wife – You have always inspired me

To my Lovely Children – You survived my absence-bravo!

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DEFINITIONS

Hypertensive Disorders of Pregnancy has been defined by a number of researchers but in this study the definition by International Society for the Study of Hypertension of Pregnancy (ISSHP), was adopted.

1. **Hypertensive Disorders of Pregnancy:** Includes chronic hypertension and pregnancy induced hypertension (4).

- **Chronic hypertension:** A Diastolic Blood pressure of 90mmHg or more that either predates pregnancy or develops before 20 weeks gestation (4, 9). A superimposed pregnancy induced hypertension may develop on those with chronic hypertension.
- **Pregnancy induced hypertension (PIH):** Which develops after 20 weeks of gestation. P.I.H is classified:

Hypertension without proteinuria or oedema: two readings of diastolic blood pressure 90-110 mmHg , 4-6 hours apart (4, 9).

Mild Pre-eclampsia: Two readings of diastolic blood pressure 90-110mmHg, 4-6 hours apart, after 20 weeks of gestation and with proteinuria of >300mg/l in 24 hours or up to 2+ and with/without oedema.

Severe Pre-eclampsia: Diastolic blood pressure is equal or greater than 110mmHg after 20 weeks of gestation. There may be severe headache, blurred vision, epigastric pain, hyper-reflexia, oliguria (urinary output equal or less than 400mls/24hours), proteinuria (protein equal or greater than 5g/24 hours; dipstick +++), increased weight (equal or more than 1000g/week, and the patient is conscious (9, 14, 34, 35).

Eclampsia: Mother is with signs and symptoms of severe preeclampsia and convulsions or coma. Oligohydrouria or Anuria is present. (16, 34, 35).

HELLP Syndrome: A syndrome of haemolysis (H) elevated liver enzymes (EL) and low platelet count (LP).

Gestational age: The duration of gestation. It is measured from the first day of the last menstrual period and is expressed in completed weeks (36).

Term period: The period from 37 completed weeks up to the end of 42nd week (36).

Preterm period: refers to less than 37 completed weeks of gestation (36).

Preterm Delivery: Birth of baby before 37 complete weeks of gestation.

Post term period: This period refers to the pregnancy length of more than 42 completed weeks of gestation (36).

Korotkoff phase v: Disappearance of heart sound during the examination of the blood pressure (38).

Birth Weight: The weight of a new born infant obtained preferably within one hour of birth (36).

Low birth weight: birth weight of less than 2500 grammes (36).

Live birth: Live birth has occurred when the new born infant breathes or shows any sign of life such as, heart beat, pulsation in the umbilical cord or movements of voluntary muscles (36).

Still birth: The birth of a dead fetus at 22 weeks or more and birth weight equal or more than 500gms (36).

Still birth rate: The number of still born infants per 1000 total births [live born + still born infants] (36).

Neonatal Death: The death of a baby that occur at less than 28 days of age with birth weight of 500gms and more.

Early neonatal death: The death of a live born during the first 7 days of life (36).

Late neonatal death: The death of a live born infant after 7 completed days, but before 28 completed days after birth (36).

Perinatal death: Perinatal deaths comprises the sum of all still births and early neonatal death (36).

Perinatal mortality rate: The sum of all perinatal deaths in relation to the sum of all still born and live born infant (36).

Maternal death: The death of a woman while pregnant or within 42 completed days of termination of pregnancy irrespective of duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or by its management but not due to accidental or incidental causes (36).

Maternal mortality ratio: The number of maternal deaths per 1000 total births (36).

Prevalence: quantifies the proportion of individuals in a population who have a disease at a specific time and provides an estimate of the probability (risk).

The formula for calculating prevalence (P) is

$$P = \frac{\text{number of existing cases of a disease at a given point in time}}{\text{Total population}} \times 1000$$ (30).

CHAPTER 1

1.1 INTRODUCTION

Pregnancy and Childbirth are natural processes in women. However, the reality is that women and children die and suffer as a consequence of childbearing process (1).

Globally half a million women die each year as a result of pregnancy and childbirth. Of these deaths, 50% occur in Africa, about 42% in Asia, about 4% in Latin America and Caribbean and less than 1% in the developed countries(2).

The maternal mortality ratio in Malawi is estimated at 1120 per 100,000 live births accounting for 21% of all deaths that occur among women aged 15 to 49 years (3).

Hypertensive disorders of pregnancy [HDP] affect 5-10% of all pregnancies worldwide and cause a substantial maternal and perinatal morbidity and mortality (4, 5). It is believed that 10-15% of maternal mortality in developing countries is due to HDP (6).

The incidence and prevalence of PIH vary from one country to another and might have genetic predisposition. Among African-Americans it is 6.4% of deliveries; in Sweden 1.5% of pregnancies (6); in West-Africa 0.64 per 100 (7); in South Africa HDP is number one cause of maternal deaths {20%} (8). In the United Kingdom hypertension in pregnancy is the most frequent cited cause of death (9, 10).

In Zimbabwe, hypertension complicates about 15% of pregnancies delivered at Harare Maternity Hospital (11).

A review of literature on pre-eclampsia/eclampsia, which was done in Malawi in 1998, indicates that this is one of the commonest causes of high maternal and infant mortality and morbidity rates (12).

Energies and resources should therefore be committed to the health needs of women so that childbearing remains a natural process. The reduction of HDP can be incorporated in international goals to reduce maternal mortality. International organizations such as the United Nations, Organization of Economic Co-operations and Development, International Monetary Fund and the World Bank adopted such a goal (13), which was eventually endorsed by the 149 heads of states at the millennium summit in 2000 (14).

The purpose of this study is to establish and document the prevalence of HDP, Maternal complications and Perinanal outcomes of HDP in Lilongwe city, Malawi.

1.2 PROFILE OF MALAWI

1.2.1 Geography

Malawi is a landlocked country in East-Central Africa, south of the Equator. It covers an area of 118,480Sq.Km. It is bordered to the North and East, by Tanzania; to the East, South and South-West by Mozambique; and to the West, by Zambia. Geographically, the country is dominated by the Lake Malawi which covers 24,400square kilometers. It is the third largest in Africa and it lies at about 460meters above sea level.

Map of Malawi.

Administratively, the country is divided into three regions which are further divided into 28 districts. The northern region with six districts; the central region with nine districts; and the southern region with thirteen districts.

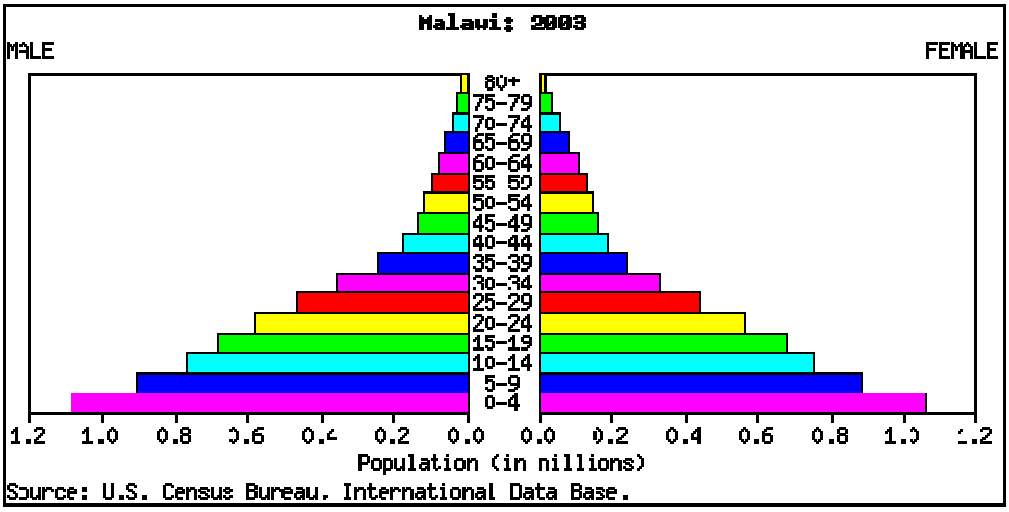
Malawi has three climates: *the Cold and Dry*, May to August, with July being the coldest month. *Hot and Dry* September to Mid-November, and the Hot and Rainy season between Mid-November and April. The wettest months are December and January.

1.2.2 Population and Demographic Characteristic

The official population of Malawi is 9.9 million people (3) and with the population density of 105 persons per square kilometer. Fourteen percent is urban population and 86% live in the rural areas. Literacy (ability to read a complete sentence and to write), vary according to age, sex, and residential area. For women at the age group of between 45 and 49 years, it is 25%, the age group of 15 to19 years, 67%. Urban men have a higher literacy rate than rural, 80% and 69% respectively. Similarly urban women have 75% literacy rate while rural women, 44%. The crude birth rate is 37.9%, the infant mortality rate is 134 per 1000 live births and the under five mortality is 234 per 1000 live births and with a total fertility rate of 6.2 children per woman. The fertility rate is usually higher among the rural illiterate women. Malawi has a young dominated population (population pyramid for 2003) with the life expectancy of 40 years for men and 44 years for women.

Malawi Population Pyramid for 2003

Age and sex distribution for the year 2003:



1.2.3 Economy

Malawi is among the least developed countries. The economy is predominantly based on agriculture which accounts for about 45% of Gross National Product and more than 90% of the country's export earnings. At least 80% of the agricurtural produce comes from smallholder farmers on customary land. The rest is produced by commercial farmers on estates. The main crops grown in Malawi are maize, tobacco, tea, sugarcane, groundnuts, cotton, wheat, coffee, rice and pulses.

Malawi is an exporter of primary produce and an importer of industrial goods. It's major exports include tobacco, sugar and groundnuts while it's major imports are intermediate {chemical and allied} goods for industry (3).

The economy also depends on substantial inflows of economic assistance from IMF, the World Bank, and individual donor nations.

1.2.4 Health Care Services

Health Care Services are provided by the Ministry of Health and Population (MOPH) 60%, Christian Health Association of Malawi {CHAM} 37%, the Ministry of Local Government (MLG) 1% and others provide 2%.

The Government provides free public health services, through the Ministry of Health and Population at the following levels:

. Referral Hospitals_ two in the southern region and each of the central and northern region has a referral hospital. These provide tertiary level health services which include surgical back up, mostly of obstetric emergencies, and general medical and pediatric in-patient care for acute conditions. There are also specialist surgical and medical interventions (25).

. District Hospitals_ twenty one district hospitals. Provides services similar to tertiary services but without specialist interventions.

. Health Centers and Rural Hospitals provide services at primary level. At this level screening and treating common uncomplicated ailments is done.

. Outreach clinics and Health Posts which are part of the primary level services.

The second major provider of health services is the CHAM which consists of a number of mission hospitals and health centers. The services are provided with minimal fees from patients while the government subsidizes (3).

1.2.4.1 Maternal Healthcare Services

Maternal Services are available at primary level, secondary level and tertiary level. Since 80% of the population, live in rural areas, the health centers and outreach clinics provide primary care such as screening, conducting normal deliveries and referring maternal complications to a higher level for specialized management. Nationwide 91% of women attend Antenatal Care Clinics (ANC), with a median number of 3.4 antenatal visits. Seventy one percent of those women who attend ANC are told about signs of pregnancy complications at the antenatal clinic. Fifty percent start antenatal clinic at 6 months gestation or beyond and 56% utilize antenatal care 4 times or more before delivery (3). A reasonable percentage, 3%, attend antenatal clinic at Traditional Birth Attendants (TBAs).

Available information indicates that 55% of women deliver in a health facility, 44% at home and 1% unknown delivery place. Fifty six percent of births are assisted by health personnel and usually those women with 4 to 5 ANC visits. Twenty three percent assisted by TBAs, 19% by friends and 2% deliver without assistance.

1.2.4.2 Human Resource

The Referral Hospitals are staffed by Specialist Doctors, Medical Officers, Clinical Officers, Registered Nurses, Enrolled Nurses and a number of specialized personnel in different departments.

The District Hospitals are staffed by the District Health Officer, who is usually a Medical Officer, Clinical Officers, Medical Assistants, Registered Nurses, Enrolled Nurses and Specialized Staff Members such as Laboratory Technicians, Dental Therapists, Public Health Officers and Community Health Nurses.

Health Centers are usually staffed by Medical Assistants as prescribers, a Community Health Nurse, Enrolled Nurses and a Health Assistant.

The Doctor: Patient ratio is still very high in Malawi at around 1: 80,000 (33).

Traditional healers also provide health care at community level (3). There is high maternal mortality ratio of 1120/100,000 live births. The table below shows some of the health indicators for Malawi.

HEALTH INDICATORS FOR MALAWI

Indicator	Measure
Maternal mortality ratio	1120 per 100,000 live births
Infant mortality rate	104 per 1000 live births
Under 5 mortality rate	189 per 1000 live births
Antenatal care coverage	91%
Skilled attendant at delivery	56%

Source: Malawi Demographic and Health Survey 2000.

The current health policy aims at ' raising the level of health of all Malawians through a sound services delivery system which will promote health by preventing, reducing, and curing diseases by protecting life and fostering general well-being and increased productivity. This policy will be achieved through primary health care (PHC) by decentralizing resources and decision making and provision of high quality of health care by training well qualified health personnel.

The study was carried out at Lilongwe Central Hospital maternity wing. The hospital is the only referral hospital in the central region of Malawi. The maternity wing serves both the rural and urban populations in Lilongwe district. The district has more than 4 government urban health centers with several private clinics; one mission hospital in both the urban and the rural areas; and more than 10 rural health centers.

CHAPTER 2. BACKGROUND

2.1 EPIDEMIOLOGY OF HYPERTENSIVE DISORDERS OF PREGNANCY.

Pregnancy and Childbirth are natural processes in women. However, the reality is that women and children die and suffer as a consequence of childbearing process (1).

Every minute of the day at least one woman dies from a complication of pregnancy and childbirth and at least 1,600 women die in the same mysterious circumstances everyday (7). Globally half a million women die each year as a result of pregnancy and childbirth. Of these deaths, 50% occur in Africa, about 42% in Asia, about 4% in Latin America and Carribeans and less than 1% in the developed countries(2). Worldwide an estimated 600,000 women die each year of pregnancy-related causes, with 99% of these deaths in developing countries (15).

Hypertensive disorders of pregnancy affect 5-10% of all pregnancies worldwide and cause a substantial maternal and perinatal morbidity and mortality (3, 10). It is believed that 10-15% of maternal mortality in developing countries is due to HDP (4).

The incidence and prevalence of PIH vary from one country to another and might have genetic predisposition. Among African-Americans it is 6.4% of deliveries; in Sweden 1.5% of pregnancies (4); in West-Africa 0.64 per 100 (8); in South Africa HDP is number one cause of maternal deaths {20%} (9). In the United Kingdom hypertension in pregnancy is the most frequent cited cause of death (10, 11).

In Zimbabwe, hypertension complicates about 15% of pregnancies delivered at Harare Maternity Hospital (12).

Pre-eclampsia continues to be one of the most common causes of maternal mortality and a significant contributor to perinatal morbidity and mortality world-wide (12).

Preeclampsia complicates 2-8% of pregnancies world-wide (14). In developed countries eclampsia is rare, affecting 1 in 2000 deliveries, while in developing countries estimates vary from 1 in 100 to 1 in 1700 (14).

Preeclampsia and eclampsia account for more than 50,000 maternal deaths a year with preeclampsia dominating in places where maternal mortality is low and eclampsia in places where maternal mortality is higher (15).

Preeclampsia is the disease of first pregnancy. Primigravid women have a threefold increased risk for developing preeclampsia (15). It also occurs more frequently in the first pregnancy from a new partner; pre-existing hypertension; multiple pregnancy and mothers of over 35years of age (16, 17, 18, and 19). It is also established that preeclampsia is associated with family history [daughters of mothers with preeclampsia more affected] and obesity (12, 20, 21, and 27).

2.2 CAUSES AND MANAGEMENT OF HYPERTENSIVE DISORDERS OF PREGNANCY

Causes of HDP: The specific cause of HDP remains a mystery. Available literature indicates the risk factors associated with HDP.

Hypertensive disorders of pregnancy especially preeclampsia occurs more frequently in young primigravidae, first pregnancy from a new partner, in mothers of over 35 years of age, preexisting hypertension, hyaditiform mole, multiple pregnancy(twin pregnancy), and in maternal diabetes (16). Long inter-pregnancy interval (17), familial history (18) and obesity (11, 19, 20) are also associated risk factors for HDP.

A study in Saudi Arabia between May 1992 and December 1993 showed that 30.3% were primigravidae and 46% were grandmultipara (6). While a similar study at Umtata General Hospital (UGH) between January 1993 and December 1994 indicated 27.3% of the hypertensive patients were teenagers, 18.3% were mothers of over 35years and 42.9% were primigravidae (21).

In Denmark, **Basso O**, established that long inter-pregancy interval was associated with higher risk of preeclampsia in women with no previous history of HDP (16).

In South Africa, a study at Tygerberg Hospital and Stellenbosch University revealed results similar to those established by **Basso.** The South African study also revealed that primigravidity had a threefold increased risk for the development of pre-eclampsia (22).

In Norway, a similar study concluded that long intervals between pregnancies, rather than change of partner, were associated with higher risk of pre-eclampsia (22).

Multiple pregnancies (twining) is another risk factor for pre-eclampsia as confirmed in previous studies (18, 23, 24).

Management of Hypertensive Disorders of Pregnancy:

Almost all researchers agree that delivery of the baby by the safest means is the best so far. Management of HDP depends on the clinical stage of the disease. The nature of the disease, which is high fatality rate in areas with high maternal mortality rate, and HDP being less responsive to improvement in basic delivery care, affect the management approach (16, 28).

Interventions aimed at primary prevention or detection of women at risk and their referral to well-equipped center (3, 16, 28). In pre-eclampsia therapeutic intervention of Magnesium Sulfate to prevent eclampsia is recommended (13, 29, 30).When eclampsia has already developed either Magnesium Sulfate, or Antihypertensive with anticonvulsant is used (14, 16). However, the results of this study show that the choice of drug varies from doctor to doctor and from patient to patient.

2.3 RATIONALE FOR THE STUDY

Birth preparednes is the key component of globally accepted safe motherhood communication programme guidelines. Awareness of the danger signs of obstetric emergencies and appreciation for the need for rapid and appropriate response when emergencies occur, are necessary for improving pregnancy.

Hypertensive disorders in pregnancy, including gestational hypertension and pre-eclampsia are leading causes of pregnancy associated morbidity. Pregnancy induced hypertension, which develops after 20 weeks, complicates 5% to 10% of pregnancies (10). In the United Kingdom, confidential enquiries have identified pregnancy induced hypertension as the most frequent cited cause of maternal death (10).

Studies in South Africa revealed that pregnancy induced hypertension is number one cause of maternal deaths {about 20% } (9).

A review of literature on pre-eclampsia/eclampsia, which was done in Malawi in 1998, indicates that this is one of the commonest causes of high maternal and infant mortality and morbidity rates (31). In Malawi this condition is treated with lytic cocktail; use of antihypertensives such as hydralazine, anticonvulsants such as diazepam and Largactil.

The maternal mortality ratio in Malawi is estimated at 1120 per 100000 live births accounting for 21% of all deaths that occur among women aged 15 to 49 years (3). This estimate is for the period of between 1994 and 2000 and double rise from 620 per 100000 live births in 1992 (3).
The figure of maternal mortality very high compared to about 27 deaths per 100000 births in developed countries.
There is high attendance of antenatal clinics {91% of the pregnant women are screened by trained health personnel; 3% by traditional birth attendants (TBAs) and the rest never attend antenatal clinic}. Only 55% deliver in the hospital; 44% deliver at home while 1% on the way to either hospital or the TBA. Of these deliveries, skilled personnel attend to 56%; and traditional birth attendants to 23%; and friends attend to 19% (3).
The high fatality rate of HDP in areas with high maternal mortality ratio and the absence of documented studies on this area in Malawi was the basis for the choice of this study.

CHAPTER 3 METHODOLOGY

Main Objective: The main objective for this study was to determine the prevalence of HDP, maternal complications and perinatal outcomes of pregnancy in patients with HDP in Lilongwe city and then to compare the results with those of a similar study done in Botswana.

Specific Objectives:

1. To determine the prevalence of HDP.
2. To determine the characteristics of patients with HDP.
3. To determine the perinatal outcomes in patients with HDP.
4. To determine the maternal outcomes/complications in patients with HDP.

Study Area:

This study was carried out at LCH maternity wing which is in the City of Lilongwe. Lilongwe is the capital city of Malawi with the urban population of 440000. As a district, it has a total of 1,339,236 people.

The hospital is the only referral hospital in the central region of Malawi. The maternity wing serves both the rural and urban populations in Lilongwe district. It (the maternity wing) has two sections, the one which provide free services at Bottom Hospital and the paying wing at 3A ward. The district has five government urban health centers that provide obstetric services such conducting deliveries of uncomplicated cases and refer complicated cases to LCH. There are several private clinics that provide general out patient services; one mission hospital in both the urban and the rural areas; and more than 10 rural health centers.

Study Design: The study was retrospective in nature. In this study, a retrospective chart review of all patients who delivered at LCH maternity wing between January 2003 and June 2003 was done. Among them, those with HDP were selected for the study

The retrospective chart review study was preferred because of its superiority over others in terms of being less costly and demands less time to implement.

Study Population:

The study population was pregnant women who were admitted and delivered at LCH between January 2003 and June 2003.

Sample Size and Selection:

Calculation of the sample size was based on the South African prevalence which was as follows: prevalence/standard error^2, with the prevalence of 46 per 1000 deliveries, 95% confidence interval and the standard error of 0.05. That is 46/1000 ÷ (5/1000 ×5/1000) = 1840 was obtained as a recommended sample size. (9, 31, 32, 35). However, this initial sample size was altered to obtain a reasonable number of HDP cases to be studied. A total of 5248 patients had their charts reviewed and 70 patients with HDP were identified.

The inclusion criteria were:

Pregnant women who had a diastolic blood pressure of equal or greater than 90mmHg, with or without proteinuria diagnosed after 20 weeks gestation were included.

Pregnant women with chronic hypertension, irrespective of the blood pressure level if they were on treatment.

Women who developed hypertension within 48 hours of delivery were included.

The exclusion criteria were: Pregnant women with normal blood pressure.

Data Collection Methods:

All women attending antenatal care clinics are recorded in antenatal books where all the information about the patient is written. The information includes demographic data, past obstetric history, past medical history and laboratory investigations. There is also information on the present pregnancy such as fundal height, type of pregnancy and maternal condition. This book is kept by the patient and is carried to the clinic at every subsequent antenatal visit. At each visit to the antenatal clinic, blood pressure, weight, symphisis fundal height and urine results are recorded. In this study hypertension was taken as diastolic pressure 90mmHg or more recorded on at least two occasions four to six hours apart.

The diastolic pressure was routinely determined at Korotkoff phase v. Symphisis fundal height is routinely done by palpation or using a tape measure. The landmarks for the fundal height are that when it is midway between sympisis pubis and umbilicus, it is 16 weeks, then 20 weeks when at umbilicus and then tape measure of 1cm equal 1 week fundal height from 22 weeks and above. Urine protein is routinely measured using dip sticks at every ANC visit, but in the case of heavy proteinuria, a 24 hour urine assessment is done. On admission, patients are given a file where all the particulars of the patient are written. The particulars include antenatal record, demographic data, the daily patient's condition, procedures performed and laboratory investigations and results. A patogram is attached to the file and contains information on, the progress of labour, foetal and maternal condition and delivery. This file is kept at records office after discharge.

Data collection was done using a compilation form. Cases were identified from the records office through reviewing every record of women who delivered at LCH between January 2003 and June 2003. The files of cases were then retrieved from the records department for review and the extracted information was recorded on the compilation form. Information included patients' demographic data, past medical history, obstetric history and laboratory investigations.

Data Analysis and Processing:

Data collected was cross-checked by reading through the compilation form and the patient's chart. This was done to assess for accuracy in recording and to assess if all information intended to be collected had been collected.

Individual cases were given a case number to avoid mixing up the data and for confidentiality.

All data was collected by the researcher himself. After data collection a code book was made and data was then entered into SPSS programme for analysis.

The chi-square test was used to determine the relationship between two categorical variables, one-way between-groups ANOVA with planned comparisons was used to compare HDP groups and the independent-samples t-test was used to compare the PMH and LCH samples.

Pre-testing:

Before the commencement of data collection, the instrument used was pre-tested. The first four charts were used for pretesting and few changes were done on the compilation form.

Ethical Considerations:

Approval to conduct the study was sought from both the Norwegian Ethical Committee and the Malawi ethical Committee. The LCH Administration also granted me permission prior to onset of data collection. The information was then anonymously collected to protect the patients' confidentiality.

There were no health or other risks with this study approach since cases were not physically/personally involved.

CHAPTER 4: SUMMARY OF MAIN RESULTS (Papers 1-2)

Hypertensive Disorders of Pregnancy: prevalence, maternal complications and perinatal outcomes at Lilongwe Central Hospital, Malawi

This paper describes data from a retrospective chart review of patients with HDP who delivered at LCH between January 2003 and June 2003. The main objective was to determine the prevalence, maternal complications and perinatal outcomes in women with HDP. Data collection was done using a compilation form. Information about patients' demographic data, past medical history, past obstetric history and laboratory investigations was collected.

Out of 5248 admissions, 70 (1.3%) had HDP. Twenty four (34%) of those with HDP were eclamptic, 29 had mild preeclampsia and 17 had severe preeclampsia. Of the 47 young mothers (16 – 25 years) thirty two (68.1%) had a severe form of HDP. Primigravidae were the most affected during the period of study (50%) of all patients with HDP. Seventy one percent of eclamptic patients were primigravidae. Half of the eclamptic patients did not attend antenatal care services. Caesarian section was done on 15 (62.5%) of the 24 eclamptic cases and on 12 (27%) of the 46 pre-eclamptic cases. Preterm deliveries were common, 17 among eclamptic patients and also 17 of the 46 pre-eclamptic cases. Twenty-two (82%) of the 27 mothers who had low birth weight children, had a severe form of HDP, compared to those with normal birth weight children. P=.001.

Lack of antenatal care might be attributed to the occurrence of the severe forms of HDP. There was great association between severe form of HDP and low birth weight.

Hypertensive Disorders of Pregnancy: Prevalence, maternal complications and perinatal outcomes at Lilongwe Central Hospital, Malawi and Princess Marina Hospital, Gaborone, Botswana. A comparative study.

This paper describes data from a retrospective chart review of patients with pre-eclampsia and eclampsia who delivered at Lilongwe Central Hospital (LCH) between January 2003 and June 2003 and similar cases who delivered at Princess Marina Hospital (PMH) between December 2002 and June 2003. The main objective was to determine the prevalence, maternal complications and perinatal outcomes in women with hypertensive disorders of pregnancy and to compare the findings. Data collection was done using a compilation form. Information about patients' demographic data, past medical history, past obstetric history and laboratory investigations was collected.

Of the 1919 women, who delivered at PMH, 100 had HDP and thus the prevalence rate was 52.1per 1000 deliveries. A total of 54 patients who had pre-eclampsia and eclampsia, giving a prevalemce of 28 per 1000 deliveries, were eligible for a comparative study. Of 5248 deliveries at LCH only 70 women had HDP, thus the prevalence rate was 13 per 1000 deliveries. There were significant differences in antenatal care attendance of the hypertensive patients: 95% at PMH compared to 51% at LCH (p=0.001). Sixty eight percent (68%) of the cases at PMH had booked by 24 weeks of gestation compared to 11% at LCH.

At LCH, 46 patients (66%) had pre-eclamptic of which 29 (41%) had mild pre-eclampsia and 17(24%) had severe pre-eclampsia while the remaining 24 (34%) cases were eclamptic. There was 1 case of chronic hypertension and no case with hypertension without proteinuria.

Of the 79 had pregnancy induced hypertension of which 46 cases had hypertension without proteinuria, 34 had mild pre-eclampsia, 19 had severe pre-eclampsia and only 1 had eclampsia.

With regards to perinatal outcome, 52% (n=28) of PMH patients had low birth weight babies compared to 39% (n=24) at LCH. Fifty four percent (n=29) of PMH had preterm delivery compared to 49% (n=34) at LCH.

Induction of labour was more common at PMH where 37% (n=20) of cases were induced; there was no record of induction of labour at LCH. Caesarian section rate at PMH was 24% (n=13) compared to 36% (n=25) at LCH.

The poor maternal outcomes at LCH may be attributed to poor utilization of antenatal care services at LCH.

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CHAPTER 5: LIMITATIONS, VALIDITY AND RELIABILITY OF THE STUDY

Limitations of the Study:

The fact that there was no possibility to enquire more about individual cases from the patients or relatives was a great limitation of the study. This was because the data collected depended on the standard of documentation, record keeping efficiency and the purpose for information documentation.

Validity and Reliability of the Study:

The data collected may not represent the entire Lilongwe district since it was conducted at a referral hospital for the district (provide services to both rural and urban populations). The findings were a reflection of the city of Lilongwe since all obstetric emergencies in the city are managed at this hospital and the prevalence was calculated basing on all pregnant women who delivered at hospital of study and all health centers in the city. The patients' records of this period were chosen because it was very close to the time the review was done. This was to consider loss of charts especially if patients delivered long time before the time of review and to ensure that the information was reliable.

The sample selection criteria provided equal opportunity for all eligible cases.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

This study was done with the background of a high maternal mortality ratio of 1120 per 10000 live births in Malawi and a lower MMR of 330 per 100000 live births in Botswana. The low prevalence of HDP in Malawi contradicts the available literature which relates higher MMR with higher prevalence.

The low antenatal coverage (51% attendance) during the period of study might mean that few women were well informed about the health services. This (low ANC coverage) might have affected the utilization of the maternal services.

The official utilization rate of the delivery services in Malawi is 55%, which means that those who do not deliver in the hospital were not included in this hospital based study. This could explain the low prevalence rate of HDP in Malawi. However, the hospital based study was favored since the diagnosis at the hospital is done by qualified personnel and usually true.

Botswana had higher HDP prevalence despite having a low maternal mortality ratio. The ANC coverage of 95% during the period of study might also mean high utilization rate of delivery services. The hospital study in Botswana, where coverage rate is high, has almost similar results with those of a community based study.

The cases in Malawi were mostly in severe form as compared to those in Botswana. The ANC coverage rates in these two study areas influence the health care seeking attitude. In Botswana where the coverage is very high, well informed women seek care early and the ANC clinic screening services identify the problem at an early stage. The patients were therefore monitored and the HDP controlled while the low coverage rate in Malawi lead to seeking health care services while in acute stage of HDP hence more maternal complications (eclampsia in Malawi).

The population in Lilongwe, Malawi should be sensitized through the already established primary health care about the importance of antenatal care attendance.

The importance of delivering in the health facility should also be re-emphasized through the safe motherhood initiative in Malawi.

There is need for much emphasis on the screening of the underlying cause of chronic hypertension in Botswana.

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Paper 1.

HYPERTENSIVE DISORDERS OF PREGNANCY: PREVALENCE, MATERNAL AND PERINATAL OUTCOMES AT LILONGWE CENTRAL HOSPITAL, MALAWI.

Kilembe FD, Stray-Pedersen B, Hussain A.

ABSTRACT

Objectives of the study were to determine the prevalence, maternal complications and perinatal outcomes of pregnancy in patients with HDP.

Materials and Methods: A Retrospective study was done by reviewing patients' journals at LCH Maternity wing from January 2003 to June 2003. Those with HDP were then selected for the study.

Results: From a total of 5248 deliveries during the period of study, 70 HDP cases were identified. Only 36 (51%) booked for antenatal care. The overall prevalence was 13 per 1000 deliveries. The mean age of the cases was 23.9 years. Among the cases 47 (67.1%) were younger women of the age group 16-25 years. Of the 70 cases, 50% (n=35) were primigravidae. Sixty five were married women and only 5 were single mothers. Of the 5 single mothers, 4 had eclampsia while 45 of the 65 married women were pre-eclamptic. There were similarities in the distribution of pre-eclampsia and eclampsia amongst the residential areas with higher number of urban cases compared to rural cases. There were 8 cases that had PIH in their previous pregnancies. Maternal complications included 17 cases of severe preeclampsia, 24 cases of eclampsia, 3 cases of disseminated intravascular coagulation, 3 cases of acute renal failure, 1case of pulmonary oedema and 1 case of maternal death. Perinatal outcomes included 34 preterm deliveries, 27 low birth weight babies, 7 stillbirths and 1 neonatal death.

Conclusion: The prevalence rate of HDP is lower than those of South Africa and Zimbabwe. This finding may be attributed to underutilization of maternity services (55% deliver in hospitals in Malawi). Primigravidae were the most affected group in this study (50%) of all the cases, a finding that is similar to findings of various studies.

INTRODUCTION

Hypertensive Disorders of Pregnancy are a major complication of pregnancy, increasing perinatal and maternal morbidity and mortality. HDP affect 5-10% of all pregnancies worldwide and substantial morbidity and mortality (1, 2). It is believed that 10 – 15% of maternal mortality in developing countries is due to HDP (3, 4, 5, 6). In particular, preeclampsia, a multisystem disorder of pregnancy, usually associated with raised blood pressure and proteinuria, complicates 2-8% of pregnancies (3, 7). Eclampsia, the occurance of grandmal convulsions superimposed on preeclampsia, is rare in developed countries, affecting 1in 2000 deliveries while in developing countries estimates vary from 1 in 100 to 1 in 1700 (8).

Worldwide an estimated 600000 women die each year of pregnancy related causes, 99% of these deaths occuring in developing countries. Preeclampsia and eclampsia account for more than 50000 maternal deaths per year (2). Eclampsia responsible for most deaths in places with high maternal mortality while preeclampsia in places with lower maternal mortality (8, 9). According to the vast studies done on HDP, the following risk factors have been identified: primigravidity, teenage pregnancy, old age pregnancy, multiple pregnancy, previous history of HDP, family history of HDP, and preexisting hypertension (10, 11, 12, 13, 14, 15, 16). Certain studies have, however, showed that poor social circumstancies (5, 17), black ethnicity (2, 5, 17) and underutilization of antenatal services (2, 17, 18) are risk factors for severe preeclampsia(5), eclampsia(2), complicated eclampsia(18) and death from preeclampsia(4, 17).

Maternal complications documented in previous studies include HELLP Syndrome, eclampsia, abruptio placenta, renal failure, cerebral vascular accident (CVA), and death. Documented perinatal outcomes include intrauterine growth retardation (IUGR), intrauterine foetal death, preterm delivery, low birth weight (LBW), and birth asphyxia.

The differences in the standard of health services, socio-economic status, and climate contribute to differences in demographic distribution of diseases (5, 19, 20, 21) hence the need to conduct research in all these environments.

To the best of my knowledge, there is no documentation of HDP prevalence, perinatal and maternal outcomes in Malawi (22, 23).

The purpose of this study was to establish and document the prevalence, characteristics and maternal and perinatal outcomes of all women who had HDP and had delivered at LCH Maternity Wing between January 2003 and June 2003.

MATERIALS AND METHODS

Study Area: This study was carried out at LCH maternity wing. A retrospective chart review of all patients with hypertension during pregnancy who had delivered at LCH maternity wing during the period January 2003 to June 2003 was done. The hospital is the only referral hospital in the central region of Malawi. The maternity wing provides secondary and tertiary services to both the rural and urban populations in Lilongwe district. The district has more than 4 Government urban health centers with several private clinics; one mission hospital in both the urban and the rural areas; and more than 10 rural health centers.

Study Population:

The cases were mothers who had delivered at the LCH during this period (January 2003 to June 2003) and had high blood pressure diagnosed antenatally, during labour, and within 48 hours of delivery. The cases were categorized into three main groups basing on ISSP description: mild preeclampsia (Two readings diastolic blood pressure 90-110mmHg, 4 to 6 hours apart, after 20weeks of gestation and with proteinuria dipstick of up to 2+), severe preeclampsia (diastolic blood pressure equal or greater than 110mmHg after 20 weeks of gestation and with proteinuria dipstick of 3+) and eclampsia (signs and symptoms of severe preeclampsia plus convulsions or coma).

Data Collection: A compilation form was used to extract information from the patient's case records. Data collection was done by the researcher. The information included demographic data, past medical history, antenatal attendance, booking status, clinical features; record of labour and delivery; treatment, complications, investigations; and perinatal outcome.

Statistical Analysis: The abstracted information was then coded and entered into SPSS 11.0 data base. Descriptive statistics were worked out and analysis was done using this programme. The chi-square test was used to determine the relationship between two categorical variables and the one-way between groups ANOVA with planned comparisons was used to compare HDP groups. P-value <0.05 was considered statistically significant.

Ethical Consideration: The study was approved by the local ethical committees in Norway and Malawi. Data was anonymously collected to ensure confidentiality.

RESULTS

A total of 5248 admissions were reviewed and 70 HDP cases were identified. The overall prevalence was 13 per 1000 deliveries.

The 70 cases had either pre-eclampsia (n=46) or eclampsia (n=24). Of the pre-eclamptic cases, 29 had mild pre-eclampsia while 17 had severe pre-eclampsia.

Social and Demographic Characteristics of Cases:

Age: The minimum age was 16 years while the maximum age was 41years, with a median of 23 years and a mean of 23.90±5.49 years. Teenagers formed 20 % (n=14) of HDP cases. Mothers over 35 years formed 4.3% (n=3) of HDP cases while the bulk of the cases were those in the age group of 20 to 24 years which formed 41.4% (n=29), followed by those in the age group of 25 to 29 years, 23% (n=16). Eight cases (11.3%) in the age group 30 to 34 years. When categorized into young (16-25yrs) and old (26yrs thru highest), 32(68.1%) of the young patients had a severe form of HDP as compared to 9 (39.1%) of the older patients.

Gravidity: Gravidity ranged from 1 to 7. HDP cases comprised of 35 (50%) primigravidae, 28 (40%) gravid 2 to 4 and 7(10%) gravid 5 thru highest.

Marital Status: Of the total number of HDP cases (n=70), 5(7%) were single mothers while 65(93%) were married women. Four (80%) of single mothers were eclamptic and 1(20%) was pre-eclamptic. Twenty (31%) of married women were eclamptic while 45(69%) were pre-eclamptic cases.

Residential Area: There were similarities in the distribution of pre-eclampsia and eclampsia in relation to the residential area. 16(67%) of the eclamptic cases (n=24) were from the urban areas and 8(33%) were from the rural areas. Pre-eclamptic cases (n=46) comprised of 36(78%) from the urban areas and 10(22%) from the rural areas.

Past Medical History:

There were 8 cases that had P.I.H in their previous pregnancies.

Booking Status:

Those who booked for antenatal care were slightly above half of the HDP cases 51% (n=36) and 49% (n=34) were not booked.

Clinical Features:

Blood Pressure: The diastolic pressure ranged from 90 to 170 mmHg with a mean of 107.30mmHg. The systolic pressure ranged from 140 to 210mmHg with a mean of 158mmHg.

Proteinuria: The bulk of the patients had 1+ proteinuria, 64% (n=45) taken on two separate occasions by dipstick on random samples of urine taken 4 to 6 hours apart. Heavy proteinuria defined as 3+ or more, was seen in 5 (7%) of the patients. The rest had moderate proteinuria, defined as 2+ on dipstick.

Gestation Age on Admission: The gestation age on admission ranged from 24 to 40 weeks with a mode of 36 weeks and a mean of 36.77weeks.

Characteristics of Eclampsia Patients:

(i). *Age*: Most eclamptic patients were younger with mean age of 20.6 years compared to preeclampsia cases with mean age 24.5years. Eclampsia occurred in 64% (n=9) of the 14 teenage mothers.

(ii). *Gravidity*: Of the 35 primigravidae, 17(48.6%) had eclampsia. Of the 24 eclamptic patients, 17 (70.8%) were primigravidae.

(iii). *Single Motherhood*: The study results indicate that being a single mother might be a risk factor for eclampsia. Four (80%) of the 5 single mothers had eclampsia compared to twenty (31%) of the 65 married women.

(iv). *Lack of Antenatal Care*: A total of 34 HDP patients didn't attend ANC. Of the 24 eclamptic patients, 12 did not attend ANC. This means that they were not monitored and therefore no timely interventions to avoid progressing into eclamptic stage.

Antenatal Management: Apart from the 4 (5.7%) preeclamptic cases who were initially managed as outpatients, the rest 66 (94.3%) were managed as inpatients. Nineteen of the inpatients were eclamptic while 37 were preeclamptic. There were different types of treatment regimes used.

Mode of Delivery: The management of pre-eclampsia and eclampsia is mainly to deliver the baby by the most suitable method. Overall, caeserian section was on 27 patients (39%), thirty-eight (54%) had spontaneous vaginal delivery and 4 (6%) had vacuum extraction done. Caesarean section was done on 15(62%) of the 24 eclamptic cases, 9 eclamptic cases delivered through spontaneous vaginal delivery (SVD).

Among the pre-eclamptic cases (n=46), 12 (27%) had caesarean section done, 29(63%) delivered though SVD and vacuum extraction was done on 4(10%) cases. There is no record of induced labour on those who had spontaneous vaginal deliveries. Table 1 shows the relationship between patients' characteristics and the mild and severe forms of HDP.

Symptoms: A number of symptoms were reported by cases in different categories. Table 2 show the symptoms reported in the three groups of HDP.

Maternal Complications: The following complications were observed:

(i). Severe preeclampsia occurred in 17 (24%) of the 70 HDP cases.

(ii). Eclampsia occurred in 24 (34%) of the 70 HDP cases. Of the eclamptic cases 16 (67%) were brought from home with history of convulsions. Eight (33%) were referred from the health centers.

(iii). Disseminated Intravascular Coagulation (DIC) occurred in 4.3% (n=3) of the cases.

(iv). Acute renal failure (oliguria or anuria with azotemia) was present in three (4.3%) of the cases. Two of these cases were eclamptic and one was a severe preeclamptic case.
(v). Pulmonary oedema occurred in 1.4% (n=1) of the cases.

(vi). Maternal death in 1.4% (n=1) of the cases. This case had a combination of the following complications: acute renal failure, pulmonary oedema and then eventual death.

Perinatal Outcomes: Among the eclamptic cases, 18 had livebirths, 5 had stillbirths and 1 had neonatal death. The pre-eclamptic had a similar pattern with 42 live births, 2 still births, and 1 maternal death. Preterm delivery (birth before 37 weeks of gestation) was prominent among eclamptic cases with 17(71%) preterm deliveries and while pre-eclamptic cases had 17(40%) preterm deliveries. Twenty seven neonates had low birth weight (birth weight below 2500grammes) while 42 had normal birth weights. There was no information about the baby whose mother died.

DISCUSSION:

The study determines the prevalence of HDP, the characteristics of HDP patients, the maternal complications and perinatal outcomes in a referral hospital. In this study the results indicate that HDP account for 1.33% all deliveries at the LCH maternity wing and health centers within Lilongwe City.

This prevalence is lower than that of Zimbabwe 8% (21), lower than the results of Umtata general Hospital in South Africa 4.6% (16), lower than the findings of Saudi Arabia 3% (14), lower than that of Sweden 1.5% (14) but higher than the prevalence of West Africa 0.64% (15). This study's findings do not reflect the previous studies in various places which indicate higher prevalence in developing countries. This might be due to low use of health facilities, 55% of pregnancy women deliver in hospitals in Malawi (22). Overall, preeclampsia accounted for 0.88% which is lower than the global estimate of 6% to 8% of all pregnancies (25). Eclampsia accounted for 0.45% of all deliveries and this is higher when compared with Saudi Arabia 0.06% (14) but lower than that of Umtata General Hospital in South Africa 0.69% (16). There was a correlation between area of resident and preeclampsia (mild and severe) and eclampsia. Most of the patients were from the urban areas which reflect higher utilization of health services by urban residents compared to rural residents. The majority of the rural residents might be among those who deliver at TBAs.

Young age (teenage and early 20s) was one of the characteristic of most patients with HDP. This distribution is not different from that of Umtata General Hospital (16) and to that of African-American women in the United States where distribution was dominant among the teenagers and the old age (26). Primigravidity was also established as one of the characteristics of the patients (50% of the cases were primigravidae) which confirm findings of various previous studies.

The limits of retrospective study were manifest when it came to previous patient's history and documentation of detail such as record of chronic hypertension.

These known risk factors (2, 27), could therefore not be thoroughly monitored. There was only one maternal death during the period of study which contrasts the findings in the United Kingdom where preeclampsia is the single most common cause of maternal deaths (28).

A number of studies have shown that HDP are associated with high morbidity, prematurity, intrauterine growth retardation and small for gestation age.

In this study 62% of births in the category of severe preeclampsia were underweight/low birth weight (LBW) and 62% of the deliveries among the eclamptic cases were underweight. Severe prematurity occurred in 4 of all cases and 3 were from eclamptic cases while 1 from the severe preeclampsia category. This is much lower than that of South Africa (16) which is 34% but with similar distribution correlating with the severe cases of HDP.

Macerated stillbirth had equal representation between the low birth weight and the normal birth weight. Seventeen of eclamptic deliveries were preterm and 17 of preeclamptic deliveries were also preterm and this finding confirms previous studies by various researchers that associate preterm births with severe cases of HDP such as eclampsia. An overall of 34 (48.6%) of deliveries among the cases were preterm. The relationship between management of HDP and outcome has not been done.

There was underutilization of antenatal care services since only 51% of the cases were booked antenatally. Severe form of HDP was more prominent among the younger women and the primigravidae. Most cases were diagnosed late (at 31 weeks gestation and above).

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TABLES

Table 1 Characteristics of patients in the two groups of mild and severe form of hypertensive disorders of pregnancy

	Mild HDP n=29		Severe HDP n=41		
Characteristic	N	Rate	N	Rate	P value
Age (y)					
16-25	15	51.7%	32	78.0%	.021 (S)
26yrs>	14	48.3%	9	22.0%	
Marital status					
Single	0		5	12.2%	.051 (S)
Married	29	100%	36	87.8%	
Gravidity					
Primigravida	12	41.4%	23	56.1%	.420 (NS)
Gravid.2-4	13	44.8%	15	36.6%	
Gravid.5>	4	13.8%	3	7.3%	
Antenatal booking					
Booked	13	44.8%	23	56.1%	.353(NS)
Not booked	16	55.2%	18	43.9%	
Diagnosis gestation (wks)					
24-30	1	3.4%	10	24.4%	.018 (S)
31>	28	96.6%	31	75.6%	
Previous PIH	5	17.2%	3	7.3%	.041(S)

>= and above, HTN=hypertension, Y= years, wks=weeks, HDP=hypertensive disorders of pregnancy

Table 2. *Description of symptoms reported in the three different groups of hypertensive disorders of pregnancy.*

Symptom	Mild Preeclampsia (n=29)	Severe Preeclampsia (n=17)	Eclampsia (n=24)
Epigastric Pain	7 (24%)	8 (47%)	4 (16.6%)
Headache	10 (34%)	12 (70.5%)	7 (29%)
Dizziness	3 (10%)	4 (23.5%)	1 (4%)
Visual Disturbance	0	2 (11.7%)	0
Vomiting	0	1 (5.8%)	2 (8%)
Mild/moderate oedema	29 (100%)	16 (94%)	22 (91.6%)
Generalized oedema	0	1 (5.8%)	2 (8%)
Convulsions	0	0	24 (100%)

Table 3 Maternal complications and outcomes of pregnancy

Complication/Outcome	Mild preeclampsia n=29	Severe preeclampsia n=17	Eclampsia n=24	
Acute renal failure	0	1	2	
DIC	0	1	2	
Pulmonary edema	0	1	0	
Maternal death	0	1	0	
Stillbirth	0	2	5	p=.495
Preterm delivery	5	12	17	p=.000
Low birth weight	5	8	14	
Neonatal death	0	0	1	

DIC= Disseminated Intravascular Coagulation

Paper 2

Hypertensive Disorders of Pregnancy: Prevalence, Maternal complications and Perinatal Outcomes at Princess Marina Hospital (PMH) in Botswana and Lilongwe Central Hospital (LCH) in Malawi. A Comparative Study.

AUTHORS: Nkubito GK, Kilembe FD, Hussain A, Stray-Pedersen B.

ABSTRACT:

Objectives of the study were to determine and compare the prevalence, maternal complications and foetal outcome for Botswana and Malawi.

MATERIALS AND METHODS: A retrospective study was done by reviewing patients' medical records who delivered at PMH from December 2002 to April 2003 and LCH from January 2003 to June 2003. Those with HDP were then selected for the study. The studies were done in the two hospitals separately using similar methods and the results compared.

RESULTS: Of the 1919 women, who delivered at PMH; 100 had HDP giving a prevalence rate of 52.1per 1000 deliveries. Out of 100 cases, 53 patients had pre-eclampsia and one had eclampsia, and these were eligible for a comparative study.

Of 5248 deliveries at LCH only 70 women had HDP, thus the prevalence rate was only 13 per 1000 deliveries. All the 70 patients at LCH had either pre-eclampsia or eclampsia and were eligible for a comparative study. There were significant differences in antenatal care of the hypertensive patients: 94% in PMH as compared to 51% in LCH (p=0.0001). At LCH, 41.4% (n=29) had mild pre-eclampsia, 24.3% (n=17) had severe pre-eclampsia and 34.3 % (n=24) had eclampsia.

At PMH, of the 54 cases, 63% (n=34) had mild pre-eclampsia, 35% (n=19) had severe pre-eclampsia and 2 %(n=1) had eclampsia. There were 4% (N=3) cases of acute failure at LCH and 4% (n=2) at PMH. There were 4% (n=2) cases of HELLP syndrome at PMH and none at LCH.

With regards to perinatal outcome, 56% of PMH patients had low birth weight babies compared to 41% at LCH. The frequency of preterm delivery was similar, 57% in PMH patients and 55% at LCH.

CONLUSION: Prevalence of HDP was lower at LCH which might be due to unrecorded home deliveries. There were more maternal complications at LCH which may be attributed to under utilization of antenatal care services.

INTRODUCTION:

Hypertensive disorders of pregnancy include chronic hypertension in pregnancy and PIH. Hypertension complicates about 10% of all pregnancies and pre-eclampsia complicates about 5% (1). Eclampsia accounts for 12% of all maternal deaths word wide (2). The most severe complications of HDP are observed in poor settings where antenatal diagnosis and management of these diseases is deficient. This article is a comparison of two researches carried out in LCH, Malawi and PMH, Botswana on patients who had pre-eclampsia and eclampsia in the period December 2002 to June 2003 for PMH and January 2003 to June 2003 for LCH.

Malawi is in South Eastern Africa and Botswana is in Southern Africa. The two countries are different in terms of economy; Malawi being a low income country and Botswana being a middle income country. Health indicators for the two countries are different. Maternal mortality ratio in Malawi is 1120 per 100,000 live births while in Botswana it is 330 per 100,000 live births.

Antenatal care attendance for the two countries is officially 91% while skilled attendance at delivery for Malawi is 56% and for Botswana is 94% (3).

In Malawi almost half of the women are delivered at home by relatives or TBAs while in Botswana hospital/clinic deliveries are common.

The purpose of this article is to compare the prevalence, maternal complications and fetal outcome in patients with pre-eclampsia and eclampsia in Malawi and Botswana with view to improve antenatal care and pregnancy outcome in hypertensive women in both countries.

MATERIALS AND METHODS:

This was a comparison of two studies done in Malawi and Botswana on pre-eclampsia and eclampsia. In both studies retrospective review of medical records was done in the period from December 2002 to June 2003 for PMH and from January 2003 and June 2003 for Malawi.

Cases excluded were those who had hypertension without proteinuria. This is because there were no recorded cases of hypertension without proteinuria at LCH while they were 46 of 100 at PMH.

Mild pre-eclampsia was defined as two readings of diastolic blood pressure 90 to 110mmHg, 4 to 6 hours apart, after 20 weeks of gestation and proteinuria.

Severe pre-eclampsia, the diastolic blood pressure is equal or greater than 110 mmHg after 20 weeks of gestation. There may be severe headache, blurred vision, epigastric pain, hyper reflexia, oliguria, proteinuria (protein equal or greater than 5g per 24 hours or dipstick 3+), and increased weight equal or more than 1000gm per week and the patient is conscious.

A compilation form was used to extract information from patient's case records. The information included demographic data, booking status, antenatal attendance, records of labour and delivery, complications and perinatal outcome.

The information obtained was coded and entered in SPSS version 11.0 and analyzed. Descriptive statistics were worked out. Cases from the two hospitals were compared using independent sample t-test and p-value equal or less than 0.05 were considered statistically significant.

RESULTS:

During the study period, out of 1919 total deliveries at PMH, there were 53 cases of pre-eclampsia and one case of eclampsia giving a prevalence of 28 per 1000 deliveries. Out of 5248 deliveries at LCH, there were70 cases that fulfilled the inclusion criteria of which 46(66%) had pre-eclampsia and 24(34%) had eclampsia giving the prevalence of 13 per 1000 deliveries.

Demographic characteristics study population:

Age: The age range of PMH patients was from 18 to 47 with a mean of 29.4 years, teenagers were 3(5.6%) while for LCH cases age range was from 16 to 41 with a mean of 23.9 years and teenagers were 5(10.9%). As observed on table1 patients were younger at LCH compared to PMH patients (P=0.0001).

Gravidity: Gravidity for PMH cases ranged from 1 to 10 pregnancies with a mean of 2.9 while at LCH it ranged from 1 to 7 with a mean of 2.2 pregnancies. No statistical significance was observed between the two hospitals.

Education: Patients at PMH had higher education than LCH patients. Seventy two percent 72% (n=39) of PMH patients had secondary education and higher compared to 40% (n=28) at LCH (P=0.02).

Marital status: Ninety three percent (n=65) of LCH cases were married compared to only 18% (n=10) of PMH patients (P=0.0001). This difference may be due to cultural differences in the two countries.

Antenatal management:

Ninety four percent (n=51) of PMH patients had booked for antenatal care while only 51% (n=36) at LCH had been booked (P=0.0001). More over (52%) of the cases at PMH had booked by 24 weeks of gestation compared to 1% at LCH (P=0.0001). Patients at LCH and PMH had made an average of 2 and 6 visits respectively by the time of delivery (P=0.0001).

Regarding drug treatment, there were no standardized regimens in both hospitals. Monotherapy with Methyldopa was commonly used at both hospitals for mild pre-eclampsia with some patients in the same category not getting any drug therapy. Both hospitals had various combined therapies for the treatment of severe pre-eclampsia and eclampsia but with diazepam added at LCH while magnesium sulfate was added for impending eclampsia at PMH.

Reported symptoms:

The most common symptom was headache followed by epigastric pain. As observed in table 2, LCH cases had more symptoms than PMH cases. The cases were also more severe at LCH.

Delivery:

There were 54% (n=29) preterm deliveries for PMH and 49% (n=34) for LCH. Induction of labour was more common at PMH where 20(37%) of cases were induced; there was no record of induction of labour at LCH. Caesarian section rate at PMH was 13(24%) compared to 25(36%) at LCH (p= 0.10).

Maternal complications:

There were more maternal complications at LCH compared to PMH. Thirty four percent (n=24) of LCH patients had eclampsia compared to only two percent (n=1) of the cases at PMH. Acute renal failure was observed in the similar frequency, 4% (n=3) of LCH patients and 4% (n=2) of PMH patients. HELLP syndrome was reported in 4% (n=2) of patients at PMH and none at LCH.

Perinatal out come:

There were more low birth weight babies at PMH 52% (n=28) than LCH 39% (27) (p=0.11). There were 12 (22%) still birth at PMH compared to 7(10%) at LCH. There was one neonatal death at LCH and none was recorded at PMH.

DISCUSSION

We compared pre-eclampsia and eclampsia frequency of two African countries with different economical background. Botswana situated in Southern Africa has a middle economy while Malawi situated in South East Africa is among the least developing countries. We compared patients referred to comparable referral hospitals. The prevalence of pre-eclampsia at PMH was 28 per 1000 deliveries. The prevalence of pre-eclampsia at LCH was 8 per1000 deliveries. There were 24 eclamptic cases at LCH and one eclamptic case at PMH. The trend of eclampsia in these two hospitals confirms previous studies that established a relationship between high maternal mortality ratios with increased eclampsia (4). Malawi has a maternal mortality ratio of 1120 per 100,000 live births as compared to 330 per 100,000 live births for Botswana. The higher cases of eclampsia at LCH are attributed to underutilization of antenatal care. Only 36 (51%) patients at LCH booked for antenatal care as compared to 51(94%) patients who booked for antenatal care at PMH. In Botswana the women came significantly earlier and had more visits than in Malawi patients. A good and regular antenatal care with screening for high risk pregnancies and quality treatment prevents hypertensive cases to progress into eclamptic stage (5, 6, 7, 8). Primigravidity was a prominent characteristic of patients with pre-eclampsia and eclampsia at both (PMH and LCH) hospitals with 31% (n=17) and 50% (n=35) affected respectively. This is in agreement with previous studies (6, 9, 10).

Teenage pregnancy was not a common characteristic of patients in our study, but young age (16 to 24 years) was significantly affected by pre-eclampsia and eclampsia. Other characteristics for pre-eclampsia and eclampsia such as previous history of pre-eclampsia, twin pregnancies, heredity (family history), and body mass index were not studied in detail due to limited of available data. Pre-eclampsia and eclampsia are known for adverse maternal outcomes (10, 11, 12).

In our studies, there were more maternal complications at LCH than PMH. At PMH two cases developed HELLP syndrome, two had acute renal failure and no maternal death while at LCH there were 24 eclamptic cases, three cases with acute renal failure and one maternal death.

Regarding the perinatal outcome, we found higher still births at PMH 12 (22%) as compared to 7 (10%) at LCH. Our findings, show that at PMH 28 (52%) had low birth weight babies compared to LCH with 27(39%). This could be due to high rate of induction of labour at PMH. Severe cases of HDP such as severe pre-eclmpsia and eclampsia result into preterm deliveries.

Our studies established that of the severe pre-eclamptic patients 75% (n=15) at PMH had preterm deliveries while at LCH there were 41% (n=7). Amongst the eclamptic patients 71% (n=24) at LCH, of them had preterm deliveries, table 3. Severe preterm (those who delivered at 32 weeks or less), were 18% at PMH and 14% at LCH but this was not statistically significant (P=0.50). Preterm delivery and low birth weight were also not statistically different in the two countries.

Most patients at both hospitals progressed into spontaneous vaginal delivery with 20 patients (37%) induced at PMH and no record of induction of labour at LCH. In the latter hospital most of the patients came in a critical stage necessitating caesarian section. In fact caesarian section was done mostly in mild preeclampia at PMH while at LCH it was mostly done on severe cases such as eclampsia. Thirteen (54%) of the 24 eclamptic patients at LCH were delivered by caesarian section.

Many previous studies have tried to establish a standard treatment but there is no global adopted regimen, hence different regimes were used at PMH and LCH respectively.

In conclusion, the prevalence in Botswana is greater than that of Malawi. Maternal complications were more at LCH. There were no statistical differences in the foetal outcome between the two hospitals. The poor maternal outcome at LCH may be attributed to underutilization of antenatal care services at LCH.

LIST OF TABLES:

Table 1

Patients' characteristics, maternal complications and foetal outcomes at PMH and LCH.

Hospital	PMH N=54	LCH N=70	p value
Demographic features:			
Mean maternal age (yrs)	29.4±8.0	23.9±5.3	0.0001(S)
Parity (mean)	1.7±2.0	1.1±1.6	0.10(NS)
Secondary Education and higher	39(72%)	28(41%)	0.0001(S)
Antenatal care:			
Booked for antenatal visit	51(94%)	36 (51%)	0.0001(S)
Gestational age at booking (weeks)	21.2±5.2	33.5±4.8	0.0001(S)
Gestational length (weeks)	36±4	36±4	0.66(NS)
Average number of ANC visits	6	2	0.0001(S)
Maternal complications			
Eclampsia	1(2%)	24 (34%)	0.0001(S)
Maternal death	0	1	
Acute renal failure	2(4%)	3(4%)	0.65(NS)
HELLP syndrome	2(4%)	0	0.09(NS)
Birth:			
Caesarian section	13(24%)	25(36%)	0.10(NS)
Induced labour	20(37%)	0	0.0001(S)
Foetal outcome			
Low birth weight	28(52%)	27(39%)	0.11(NS)
Pre-term delivery	29(54%)	34(49%)	0.18(NS)
Still birth	12(22%)	7(10%)	0. 04(S)
Neonatal death	0	1	

NS= not significant S= significant

Table 2
Symptoms reported by the patients both at PMH and LCH.

Symptom	PMH (n=54)	LCH (n=70)
Headache	15(28%)	28(40%)
Dizziness	9(17%)	7(10%)
Epigastric pain	7(13%)	18(26%)
Visual disturbance	1(2%)	3(4%)
Nausea	2(4%)	1(1.4%)
Vomiting	2(4%)	4(6%)
Convulsions	1(2%)	24(34%)

Table 3
Perinatal outcome for patients with pre-eclampsia and eclampsia PMH and LCH.

	Mild pre-eclampsia		Severe pre-eclampsia		Eclampsia	
	PMH(n=34)	LCH(n=29)	PMH(n=20)	LCH(n=17)	PMH(n=1)	LCH(n=24)
Caesarian section	10(29%)	8(28%)	3(15%)	4(23%)	0	15(62%)
Low birth weight	14(41%)	2(7%)	13(65%)	10(59%)	0	15(62%)
Still birth	6(18%)	1(3%)	6(30%)	1(6%)	0	5(21%)
Preterm delivery	12(35%)	10(34%)	15(75%)	7(41%)	0	17(71%)

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APPENDICES:

APPENDIX 1.

COMPILATION SHEET:

IDENTIFICATION NUMBER AND INITIALS:…….

REFERRAL: 1. Yes 2. No If Yes, from?.....

DEMOGRAPHIC FEATURES:

1. Age ……
2. Home village……
3. Education level: 1. None 2. Primary 3. Secondary 4. Tertiary
4. Marital status:
    1) Married 2) Single 3) Separated/divorced
    4) Widow

OBSTETRIC HISTORY:

1. Gravidity …… Twin Pregnancy? 1. Yes 2. No
2. Parity …… Livebirths……..
   Stillbirths…… Cause?……..
   Abortions……..... Cause?.....

PAST MEDICAL HISTORY:

1. Chronic hypertension
2. Pregnancy induced hypertension
3. Diabetes mellitus
4. Other(specify) .....

BOOKING STATUS:

1. Booked 1. Yes 2. No
2. First booking 1. date..... 2. Gestation..... 3. Blood Pressure.....
   4. weight.....
3. Number of routine prenatal checkups.....
4. Number of non-routine prenatal checkups.....
5. Gestation at which BP. Increased.....

CLINICAL FEATURES ON ADMISSION:

1. Headache ……1. Yes 2. No 3. Not recorded
2. Dizziness……1. Yes 2. No 3. Not recorded
3. Epigastric pain……. 1. Yes 2. No 3. Not recorded
4. Visual disturbance……. 1.Yes 2. No 3. Not recorded
5. Nausea…….1.Yes 2. No 3. Not recorded
6. Vomiting…… 1. Yes 2. No 3. Not recorded
7. Convulsions…… 1. Yes 2. No 3. Not recorded
8. Blood pressure:……
9. Oedema 1. None 2. Mild 3. Moderate 4. Generalized
10. Height (Meters)
11. Weight (Kilograms)

INVESTIGATIONS:

1. Haemoglobin 1. highest level…….. 2. lowest level……...
2. Platelet count…….
3. Liver function 1. Normal 2. Deranged
4. Renal function 1. Urea =…….. 2. Creatinine=……..
   3. Twenty-four hour urine protein……...
   4. Dipstic urinalysis = 1+ 2+ 3+

ANTENATAL MANAGEMENT:

1. Number of admissions in this pregnancy……
2. Drugs given during pregnancy: Comments if on Drug:
    1) Methyldopa…….. 1. No 2. Yes
    2) Nifedipine …… 1. No 2. Yes
    3) Hydrallazine…… 1. No 2. Yes
    4) Magnesium sulphate 1. No 2. Yes
    5) Diazepam……1. No 2. Yes
    6) Other (Specify)……..

DELIVERY/ TERMINATION OF PREGNANCY:

1. Gestation……
2. Blood pressure……
3. Proteinuria a. 1+ b. 2+ c. 3+
4. Mode of delivery
    1) SVD
    2) Induced
    3) Vacuum extraction
    4) Caesarean section
    5) Other (specify)

MATERNAL COMPLICATIONS:

1. Eclampsia: 1.Yes 2. No
2. Abruptio placenta: 1. Yes 2. No
3. HELLP syndrome: 1. Yes 2. No
4. DIC (Dissemineted intravascular coagulation)
   1. Yes
   2. No
5. Acute renal failure: 1. Yes 2. No
6. Pulmonary oedema: 1. Yes 2. No
7. Cerebral pathology: 1. Yes 2. No
8. Maternal death: 1.Yes 2. No

PERINATAL OUTCOME: Boy/ Girl

1. Birth weight ……
2. Apgar score: 1. At 1 minute..... 2. At 5 minutes.....
   3. At 10 minutes.....
3. Outcome of delivery: 1. Live birth.....
   2. Macerated stillbirth
   3. Fresh stillbirth
4. Neonatal death
   1.Yes. If Yes, How old?.....
   2.No
5. Placenta: 1. weight ……. 2. condition……
6. Estimated blood loss……
7. Duration of admission…….
8. Number of days of hospitalization after delivery……
9. Proteinuria at discharge……..